

touch of the apparatus for regulating the more delicate movements of the telescope.

In order to protect it from the weather, which was found to injure its action and derange its adjustments, the author erected an observatory to contain it, consisting of a light piece of carpentry, 16 feet in diameter, with a revolving conical roof rising 9 feet above the walls, containing about 360 square feet of surface, and weighing about 10 cwt. It is moveable by a simple apparatus, made to revolve and open to any required azimuth, by the application of a force of about 10 or 12 pounds.

His first object in the preliminary experiments was to ascertain the best position of the lenses for diminishing as much as possible the secondary spectrum. For this purpose he reverts to the formulæ given in a preceding paper, whence he deduces equations applicable to this object. The mode of constructing different parts of the telescope is then particularly described, especially that of the fluid lenses, and of effecting the proper centering, and other adjustments. He then describes its power when applied to several double stars. By its means  $\eta$  Persei, marked as a treble star in South's and Herschel's catalogue, is seen distinctly sextuple; four of the smaller of these stars, together with a larger one, form a miniature representation of Jupiter and his satellites. Of the planets, he has only had opportunities of trying the telescope on Venus, Saturn, and Mars, all of which appear with remarkable brightness and distinctness. The moon is also remarkably beautiful; every minute distinction of figure and shade being brought into view.—The paper concludes with a detailed description of the various parts of the telescope and stand, illustrated by a drawing.

*On the Dip of the Magnetic Needle in London, in August, 1828. By Captain Edward Sabine, of the Royal Artillery, Sec. R.S. Read January 8, 1829. [Phil. Trans. 1829, p. 47.]*

This paper commences by noticing that the Philosophical Transactions contain the record of observations on the dip of the needle in London, from the early part of the last century to the present time. That these observations all concur in showing a progressive decrease of the dip during the whole period in question, but that they are insufficient in number and frequency, and the earlier ones particularly, in the required accuracy to enable us to determine whether the annual decrease has been uniform or otherwise.

The author having taken much pains to obtain a correct determination of the dip in the Regent's Park, in August 1821 (published in the Philosophical Transactions for 1822), repeated his observations in August 1828, at the expiration of seven years from the former determination; an interval which he considered sufficient to throw light on the rate at which the dip is at present diminishing. In consequence of the increase of buildings in the Regent's Park, he was induced to change the place of observation to the Horticultural So-

ciety's garden, at Chiswick; the distance apart is about five miles, but the direction is as nearly as possible that of the line of equal dip.

The apparatus, modes of observing, and needles employed, are fully described. The needles were four in number; one, of the ordinary construction; a second, fitted with Professor Meyer's apparatus for avoiding the errors arising from the non-coincidence of the centres of gravity and motion; a third, having a cross of wires attached to the axis, on the well-known plan of Dr. Mitchell; and a fourth, devised by Mr. Dollond, the middle of which is a cube perforated at right angles, so that the axis may be inserted in eight different ways.

In addition to his own apparatus and needles, the author obtained from the Colonial Department the use of a smaller apparatus, with a needle on Professor Meyer's plan, the same which was used by Captain Franklin, on his last land expedition. The observations with this apparatus were made by Mr. David Douglas, of the Horticultural Society. The results were as follows:—

With the ordinary needle .....	69° 46' 1
With Meyer's needle .....	69 47·4
With a needle having an adjusted axis ..	69 38·3
With Mr. Dollond's needle .....	69 51·7
With the smaller apparatus .....	69 51·4
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Dip in London, in August, 1828 .....	69 47·0

From the observations of 1821 and 1828, the author finds a decrease in the dip in London, of 17'·5 in seven years, or an annual decrease of 2'·5.

The average annual decrease for the century preceding 1821 appears, from the most authentic observations, to have exceeded 3'. On examining the series of observations made on the dip in Paris since 1798, by MM. Humboldt, Gay Lussac, and Arago, the author finds a corresponding indication of a recent diminution in the yearly decrease of the dip; it appearing, by those observations, that the average yearly decrease, in the first half of the period between 1798 and 1828, exceeded 4'·75; and in the second half fell short of 3'. He concludes by remarking, that a repetition of the observations in London, at the expiration of another seven years, and a continuation of those at Paris, will probably afford a decisive indication on this point; and notices, in case the annual change shall prove to be diminishing in this part of the world, the importance of determining the precise period at which the dip shall become stationary, and the minimum to which it shall then have arrived.